# Practical experience and confidence in managing emergencies among preregistration house officers

ORIGINAL ARTICLE

# Practical experience and confidence in managing emergencies among preregistration house officers

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**Objectives:** To assess the experience gained by pre-registration house officers (PRHOs) at the end of their first post. To assess confidence in managing common emergencies and experience gained in practical procedures. To compare traditional six month posts with four month posts and to compare the experiences of PRHOs posted in teaching hospitals (THs) with those based in district general hospitals (DGHs).
**Design:** Interview questionnaire.
**Participants:** 152 graduates from Edinburgh University Medical School in 2000 who had completed their first PRHO post by February 2001.
**Results:** There were few significant differences in confidence in managing emergencies and in numbers of practical procedures attempted between respondents from four and six month posts or between those holding TH and DGH posts. PRHOs had gained little experience in practical procedures: fewer than 15% had performed five or more of a number of procedures including lumbar puncture, pleural aspiration, chest drainage, and insertion of nasogastric tube. A high proportion of PRHOs indicated that they felt confident initiating management of conditions in specialties of which they had little or no experience.
**Conclusions:** Rotations of three four month posts do not seem to reduce overall experience in the PRHO year. There is little difference in experience gained between TH and DGH posts. PRHOs perform few practical procedures and some may be overconfident in their own abilities.

In the United Kingdom the early postgraduate training of pre-registration house officers (PRHOs) has undergone great changes over recent years after the restructuring of undergraduate training and the reduced clinical experience associated with the European Working Time Directive and the New Deal on junior doctors' hours. There has been a move towards three posts of four months each, instead of the traditional two posts of six months and it has been suggested that this may reduce the experience gained in medicine and surgery. Although never proven, there is the perception among many trainees that PRHOs gain more experience of practical procedures and management of common emergencies in district general hospitals (DGHs) than in central teaching hospitals (THs). Recent evidence has suggested that there are deficiencies in the competence of junior doctors in dealing with common emergencies,[1] which is an important concern to both the profession and public. Furthermore, when assessing competence in the setting of managing cardiac arrest, it has been shown that confidence of junior doctors does not correlate with competence.[2]

The aims of this study were to assess experience gained by PRHOs during their first post, in particular to compare experience in four and six month posts, as well as TH and DGH posts. Two aspects of experience were assessed; firstly confidence in managing a series of index conditions that are common or life threatening, or both, in medicine or surgery; secondly numbers of selected practical procedures that the doctor had performed during the post. A range of procedures was selected. Some were those that a PRHO might be expected to perform competently early in their career, others were procedures that a senior house officer (SHO) might be expected to perform competently. Many of the procedures and emergencies selected were the subject of a study from a different region in 1986, in which at least two thirds of respondents were confident with these procedures by the end of the PRHO year.[3] Many of the same procedures were chosen for our study to permit comparison, but our data were collected after the first PRHO post to permit comparison between different types of post.

## METHODS

Graduates from Edinburgh University Medical School in 2000 working as PRHOs in the south east of Scotland region in February 2001 who had completed the first six months of their pre-registration year were questioned by telephone or personal approach after the end of their first post. Names were obtained from the Scottish PRHO Allocation system register of Edinburgh University Medical School graduates working in Scottish hospitals. A standardised form was prepared and all participants were asked the exact same questions that were read directly from the interview sheet. It was emphasised to subjects that their answers should only relate to the first four or six month post and subsequent experience gained should be disregarded. Three quarters of interviews were completed in the first two weeks of February 2001. At least three attempts were made to contact those not recruited and at the end of March 2001 subjects who still had not been interviewed were excluded. Respondents were asked the following two questions. (1) ''How many of the following procedures had you performed by the end of your first post'' and (2) ''By the end of your first post, in which of these conditions did you feel confident to make a diagnosis and to initiate management''. Comparisons were performed between proportions with Fisher's exact test using SPSS software (v11.0 SPSS, Chicago, IL, USA). All analyses represent two by two contingency tables ($\chi^2$) to the first degree of freedom.

## RESULTS

A total of 192 subjects were identified. Their posts were in Scottish THs, or DGHs in Scotland, Northern Ireland, and

**Abbreviations:** PRHO, preregistration house officers; TH, teaching hospital; DGH, district general hospital

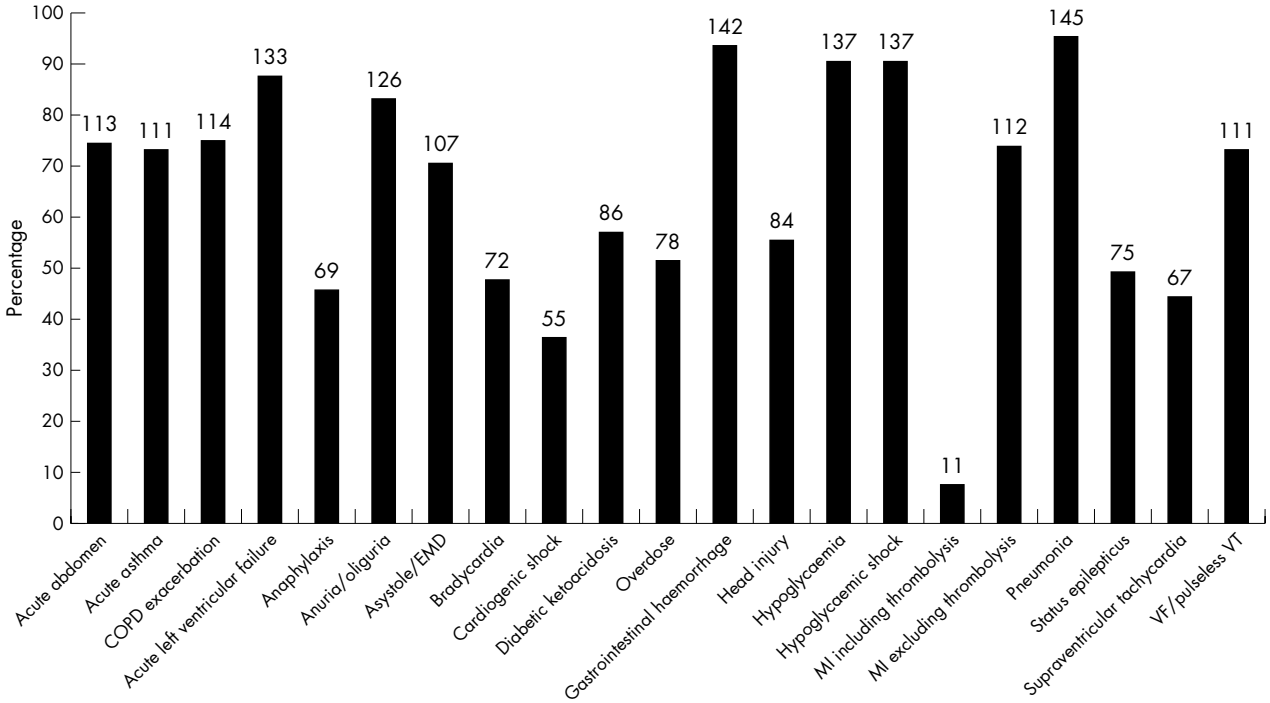


**Figure 1** Proportion of respondents (n = 152) confident in dealing with common emergencies after first PRHO post. COPD, chronic obstructive pulmonary disease; EMD, electromechanical dislocation; MI, myocardial infarction; VF, ventricular fibrillation; VT, ventricular tachycardia.

England. Five were excluded as they had not completed their first post because of late graduation. Of those remaining, 152 (81%) were successfully interviewed within the two month study period. Of these 130 (86%) were interviewed by telephone and 32 by personal approach. The posts that the respondents had just completed were: medicine (73 respondents, 48%); surgery (70, 46%); anaesthetics (5, 3%). Four respondents (3%) had completed four month posts in other specialties. Seventy five (49%) respondents were from TH posts, and 77 (51%) were from DGHs. Forty seven (31%) were from four month posts and 105 (69%) from six month posts.

## Management of common emergencies

Figure 1 shows the overall proportion of respondents who indicated that they felt confident in diagnosis and initial management of common medical and surgical emergencies. In all but two of the emergencies studied, no significant ($p<0.05$) differences in confidence in dealing with these emergencies were found between PRHOs from THs compared with those from DGHs. The only two emergencies in which a difference was found were overdose and ventricular fibrillation/pulseless ventricular tachycardia (VF/VT). PRHOs from THs reported that they were less confident in dealing with overdose and (VF/VT) compared with PRHOs from DGHs. Thirty five per cent of TH PRHOs were confident in managing overdose compared with 68% of those from DGH ($\chi^2 = 16.4$, $p<0.001$). For VF/VT the figures were 65% compared with 81% respectively ($\chi^2 = 5.3$, $p<0.05$).

Comparing confidence of respondents on the basis of the duration of the post, more respondents from four month posts (28 of 38, 74%) felt confident in managing diabetic ketoacidosis than those from six month posts (55 of 105, 52%; $\chi^2 = 4.76$, $p<0.05$). For all the other emergencies studied, there was no significant ($p<0.05$) difference between the respondents from four and six month posts.

The numbers of respondents who felt confident in dealing with these common emergencies is shown in figure 2 defined by the specialty of the PRHO post that they had just completed. PRHOs who had just completed surgical posts were significantly more confident in dealing with the acute abdomen ($\chi^2 = 37.8$, $p<0.0001$), anuria/oliguria ($\chi^2 = 16.5$, $p<0.0001$), and head injury ($\chi^2 = 23.5$, $p<0.0001$) than their counterparts in medicine. By contrast PRHOs who had just completed medical posts were significantly more confident ($p<0.05$) in managing all other conditions with the exception of anaphylaxis, cardiogenic shock, gastrointestinal bleed, hypovolaemic shock, and administration of thrombolysis in which there was no significant difference in confidence between respondents completing different specialty posts. Figure 2 also illustrates that a large number of respondents felt confident in managing conditions from specialties that they had not experienced in their first post.

## Practical procedures

Figure 3 shows the proportion of all respondents who reported to have attempted a number of practical procedures that are commonly performed by PRHOs. Other than in femoral blood sampling, no more than 15% of PRHOs reported they had performed any of these procedures more than five times by the end of their first post.

A significantly higher proportion of respondents from DGH than from THs had attempted three of the procedures: pleural aspiration ($\chi^2 = 6.9$, $p<0.01$), abdominal paracentesis ($\chi^2 = 5.2$, $p<0.05$), and femoral blood sampling ($\chi^2 = 7.9$, $p<0.01$). There were no other significant ($p<0.05$) differences between PRHOs from TH or DGH for any of the procedures studied.

The proportion of respondents from six month posts who had attempted a procedure was higher than those from four month posts in only two procedures: central line insertion ($\chi^2 = 5.4$, $p<0.05$) and abdominal paracentesis ($\chi^2 = 3.9$, $p<0.05$). PRHOs in specialties other than medicine and surgery were excluded from this specific analysis.

Table 1 breaks down the experience in practical procedures by specialty of post and shows that the five PRHOs in

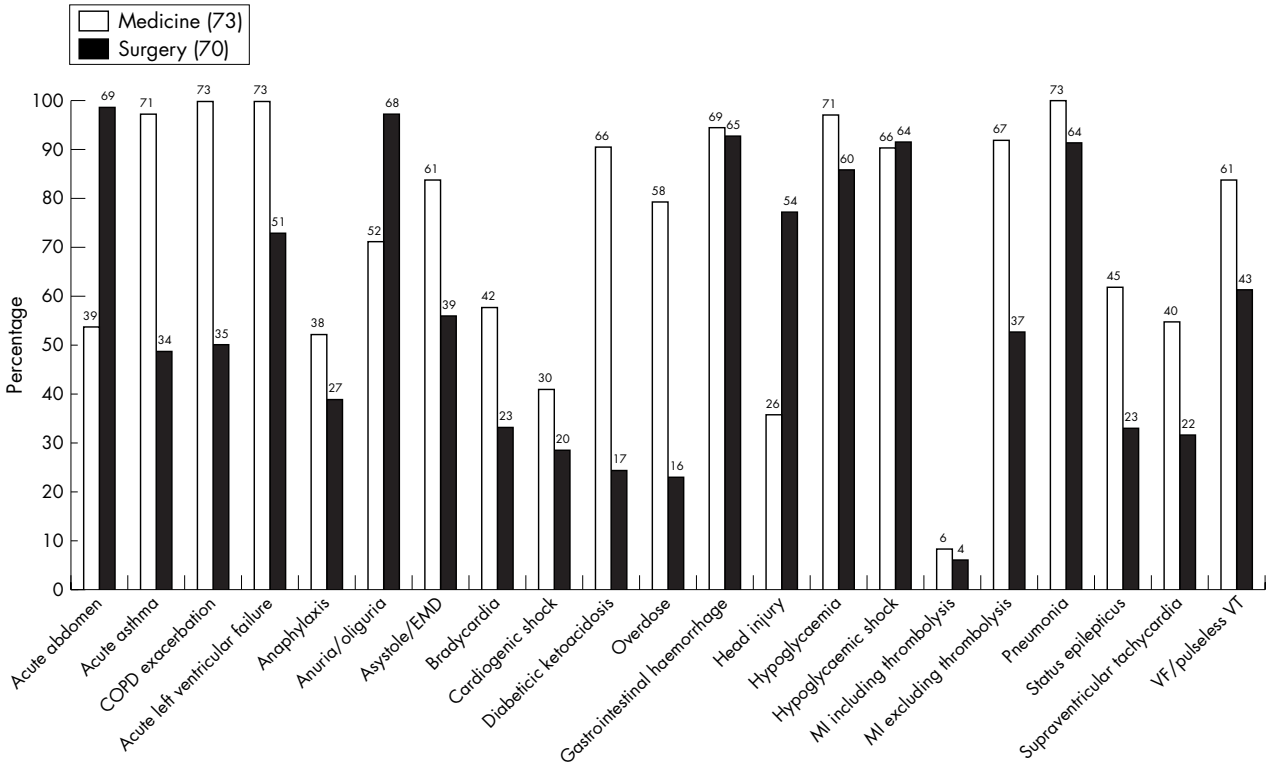


**Figure 2** Proportion of respondents (n = 143) confident in dealing with common emergencies after first PRHO post: breakdown of medical and surgical posts. Abbreviations as in figure 1.

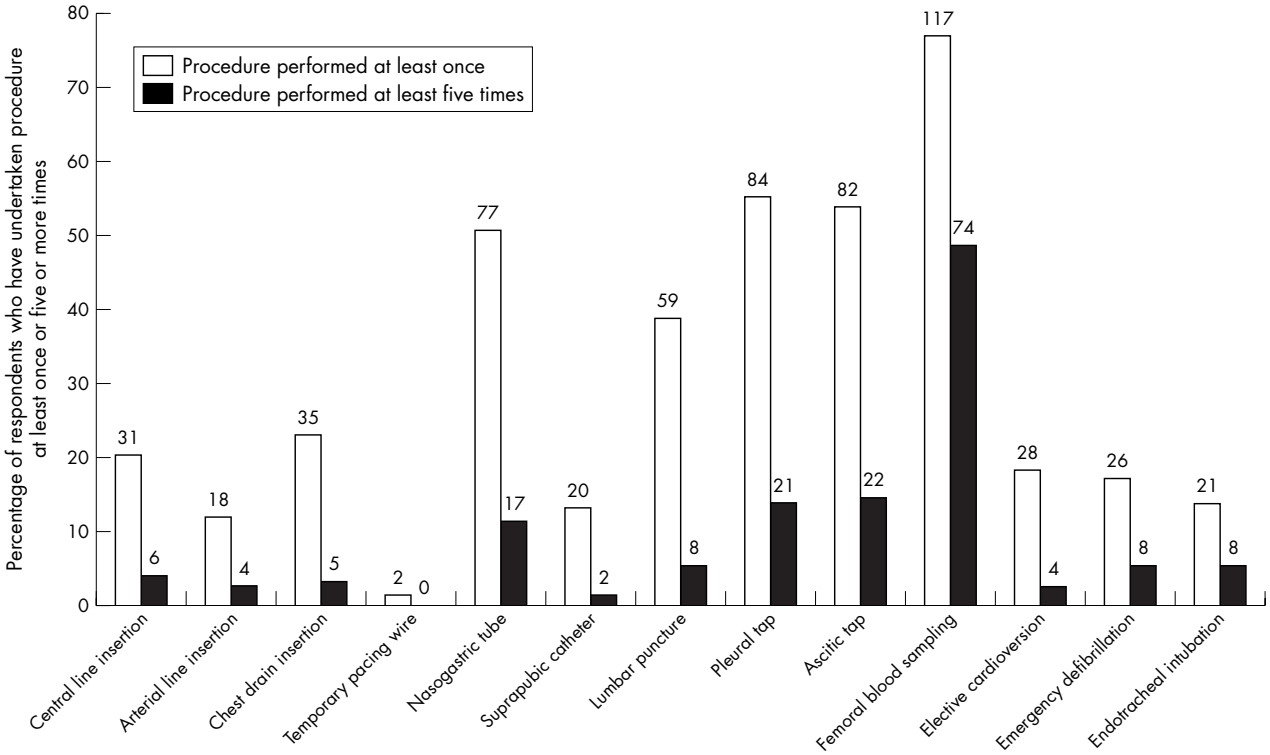


**Figure 3** Experience in practical procedures among PRHOs (n = 152) who had completed their first clinical post.

**Table 1** Experience in practical procedures: comparison by specialty, with numbers (percentages) of PRHOs in each group who had attempted a procedure at least once

| | Anaesthetics (n = 5) | Medicine (n = 73) | Surgery (n = 70) |
|---|---|---|---|
| Central line insertion | 5 (100) | 12 (16) | 13 (19) |
| Arterial line insertion | 5 (100) | 3 (4) | 9 (12) |
| Chest drain insertion | 0 | 25 (34) | 9 (12) |
| Temporary pacing wire | 0 | 2 (3) | 0 |
| Nasogastric tube | 4 (80) | 34 (47) | 39 (56) |
| Suprapubic catheter | 0 | 7 (10) | 13 (19) |
| Lumbar puncture | 5 (100) | 51 (70) | 3 (4) |
| Pleural tap | 0 | 62 (85) | 22 (31) |
| Ascitic tap | 1 (20) | 52 (71) | 29 (41) |
| Femoral blood sampling | 5 (100) | 62 (85) | 49 (70) |
| Elective cardioversion | 3 (60) | 22 (30) | 3 (4) |
| Emergency defibrillation | 1 (20) | 20 (27) | 5 (7) |
| Endotracheal intubation | 5 (100) | 3 (4) | 13 (19) |

anaesthetics posts gained considerably more experience in a number of procedures than their colleagues in other specialties.

## DISCUSSION

The data from this study suggest that the experience gained by PRHOs in four month posts is similar to that gained in six month posts, both in terms of experience in practical procedures and in confidence gained in managing common emergencies. The finding that those who undertake four month posts do not get less experience than those in six month posts in the common emergencies studied suggests that the increasing move towards year long rotations of three four month posts has the potential to give valuable additional experience of emergencies and procedures compared with the traditional two posts of six months. The experience of practical procedures gained by PRHOs in anaesthetics (table 1) highlights this finding. There is evidence that such additional varied experience is valued by both consultants as well as PRHOs.[4]

Our data do not support the suggestion that DGH posts offer better training opportunities than TH posts for this region. These data are in contrast with a study in the south east of England, where a gradient of increasing quality of teaching and clinical experience was found from the THs, through the non-teaching hospitals in London, and then to DGHs outside London.[5] The difference in confidence in managing overdose seen in our study is probably attributable to local referral patterns in the Edinburgh THs. The difference for cardiac arrest may be because almost all medical PRHOs in the south east Scotland DGHs are members of the cardiac arrest team, which is not necessarily the case in THs. The higher proportion of respondents from DGHs than THs who had attempted pleural aspiration and abdominal paracentesis could be because PRHOs at THs are assigned to more specialised units, such as respiratory or gastrointestinal wards compared with PRHOs in DGHs who are typically attached to general medical units and so might get a broader range of opportunities. However, the absence of significant differences in experience in the other procedures studied suggests this effect is limited.

These data do highlight a lack of opportunities for PRHOs to undertake practical procedures. Even for femoral arterial or venous blood sampling, the most commonly undertaken procedure studied (fig 3), fewer than half of the PRHOs had undertaken the procedure five times or more. Although assessing the competency of respondents at performing procedures is very difficult and was beyond the remit of this study, experience of five or more supervised attempts at a procedure might reasonably be taken as a measure of a person's readiness to perform a procedure without supervision. Nearly half of respondents had not passed a nasogastric tube, possibly suggesting that the increasing use of nursing staff to perform such procedures is reducing training opportunities for PRHOs. With increasing numbers of practical procedures being learnt and successfully performed by nurses it could be argued that doctors no longer need to learn certain procedures at all. However, in the more difficult cases the PRHO is often asked to assist or take over, which would be impossible if the doctor has never previously performed the procedure in question. Furthermore, doctors are often required to perform many of these procedures rapidly and safely in an emergency; to be able to do this they require prior experience of such procedures in a more controlled setting. Doctors starting a senior house officer post would historically have been competent in many of these practical procedures, so it is of concern that so few of today's PRHOs are gaining adequate experience. This has implications for the training and supervision of junior doctors. Our figures represent a substantial deterioration compared with the study 15 years ago in Liverpool, in which all but 13% of PRHOs had passed a nasogastric tube and two thirds were confident in lumbar puncture, abdominal paracentesis, and insertion of chest drain.[3] Although the region and methodology differs between the study by Elizabeth and Hughes and this study, the differences in outcomes are substantial. Essentially, we have found a much lower level of experience with practical procedures than UK PRHOs of 15 years ago. While the reasons for this may be manifold it is possible that further reductions in junior doctors' working hours may have had an impact on training opportunities.

Of concern is our finding that 30% of PRHOs did not feel comfortable at a cardiac arrest (fig 1) despite widespread

### Key learning points

- A rotation of three four month PRHO posts offers experience equal to or better than the traditional two six month posts.
- The experience gained at PRHO level in teaching hospitals is similar to that in district general hospital posts.
- PRHOs are getting insufficient experience of practical procedures.
- Some PRHOs may be overconfident in their clinical abilities.

increases in resuscitation training. It is important, however, to recognise that a PRHO can be competent even if not confident.[2] The aim of this study was to assess confidence of PRHOs and no attempt was made to assess competence.

From our results, a degree of overconfidence among PRHOs is suggested. More than half of respondents indicated that they felt confident in the initial management of clinical conditions usually referred to a specialty in which that doctor had yet to work. For example 53% of respondents who had completed only their medical PRHO post felt confident in managing patients with an acute abdomen (fig 2) even though they had had no clinical surgical experience at that point. Similarly over half of respondents who had no clinical experience in acute medical on-call indicated that they felt confident in managing ''medical'' conditions such as acute asthma, acute left ventricular failure, acute exacerbation of chronic obstructive pulmonary disease, and acute myocardial infarction. However, we do acknowledge the constraints in our methodology that are discussed below. In a recent study from Portsmouth,[1] 40% of junior doctors could not identify the correct adult hourly minimum urine output, while 83% of the respondents in our study felt confident in dealing with oliguria and anuria. Similarly 29% of doctors in that study failed to identify the need to check the blood glucose in an unconscious patient, while 90% of our subjects felt confident in managing hypoglycaemia. Furthermore, 4 of 70 (6%) of our respondents who had only completed a surgical PRHO post indicated that they would be confident administering thrombolysis to a patient suffering a myocardial infarction. This highlights the potential dangers to patient care from overconfidence of PRHOs in their own abilities.

Clearly there are difficulties in assessing PRHOs' clinical and practical skills. One report suggests that not only PRHOs but also their supervising consultants have a limited ability to assess PRHOs' clinical skills,[6] so firm conclusions cannot be drawn solely on the PRHOs' own opinions. In our study two slightly different approaches to the interview were used and it is possible that this might have influenced the replies given, but as 86% were interviewed by telephone any difference is likely to be small. Additionally as all the interviews were performed within the same two month period, respondents from four month posts had already completed at least two months of their subsequent post. Even though the study questionnaire was designed to prompt respondents to give answers relating only to their first post, there is a possibility that the answers given by the respondents from the four month group could have been influenced by their experience in their subsequent post. We have achieved accurate data retrieval from a large and representative population of new PRHOs in Scotland from a single year cohort. The variations in process of data retrieval, namely telephone interview or person to person interview, are so small that they are unlikely to have substantially influenced the outcomes measured and the statistical analyses used are robust.

In conclusion we suggest that in terms of exposure to practical procedures and confidence in dealing with emergencies, there are no clear disadvantages of rotations of three four month posts compared with two six month posts. Similarly, experience gained by PRHOs in TH and DGH posts is similar. The limited overall experience in practical procedures suggests that opportunities for training need improvement. Reductions in the working hours of junior doctors have the potential to reduce clinical experience and practical skill acquisition unless the structure of training is altered. The confidence of many PRHOs after their first post in dealing with common emergencies may exceed their clinical experience and ability and this raises concern for clinical standards and patient safety. These findings have important implications for students applying for their PRHO posts, PRHOs themselves, and all those involved with the undergraduate clinical teaching programme and the training and supervision of junior doctors at all levels.

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